

IN THE CLAIMS

The following claim listing replaces all prior listings and versions of the claims:

LISTING OF CLAIMS

Claim 1. (Canceled)

2. (Currently amended) A trick play method for achieving a trick play mode with a digital storage medium used to record and reproduce multimedia content including compression coded digital audio and video data, the digital storage medium ~~recording~~ comprising

 a directory segmenting the content into programs ~~units~~, further segmenting the content into a plurality of media objects ~~units~~, and recording each media object ~~unit~~ as a separate file,

 a program manager file storing a table ~~containing~~ including an identifier (ID) for each program of recorded content and information about the media objects in each program,

 a media object information file storing a table ~~containing~~ including playback time information and entry points at a specific time interval for each media object,

 a playlist manager file ~~containing~~ comprising playlist information including a user-specified playback start program ID and ~~[[the]]~~ a specified playback start time and end time of ~~[[said]]~~ a program~~[[;]]~~,

 a management data file ~~containing~~ including a resume marker ~~consisting of~~ comprising a program ID for a program where playback was last interrupted and playback interrupt time where playback was interrupted in the program~~[[;]]~~,

the trick play method achieving a fast-forward play mode when the user selects fast-forward play, the trick play method comprising by:

reading ~~[[the]]~~ a media object information in ~~[[the]]~~ a program specified by ~~[[the]]~~ a resume marker in sequence from the beginning;

sequentially comparing ~~[[the]]~~ a playback time in the media object information with ~~[[the]]~~ an interrupt time to detect media object k where ~~[[the]]~~ a cumulative playback time first exceeds the interrupt time;

detecting ~~[[the]]~~ an entry point identified by a number determined by calculating the difference of the interrupt time specified by the resume marker minus ~~[[the]]~~ a total playback time to ~~[[the]]~~ an immediately preceding media object, and dividing this difference by ~~[[the]]~~ a time search table resolution in the media object information of media object k;

reading and supplying, to ~~[[the]]~~ a decoder, entry frame data for ~~[[the]]~~ a media object data ~~unit~~ corresponding to said entry point;

~~thereafter~~ repeating the above steps to supply entry frame data for ~~[[the]]~~ a next media object data ~~unit~~ to the decoder; and

rewriting the resume marker when fast-forward play ends with the program ID of the program at which playback is interrupted and the interrupt time in said program.

3. (Currently Amended) A trick play method for achieving a trick play mode with a digital storage medium used to record and reproduce multimedia content including

compression coded digital audio and video data, the digital storage medium ~~recording~~
comprising

a directory segmenting the content into programs ~~units~~, further segmenting the
content into a plurality of media objects ~~units~~, and recording each media object ~~unit~~ as a
separate file,

a program manager file storing a table ~~containing~~ including an identifier (ID) for
each program of recorded content and information about the media objects in each
program,

a media object information file storing a table ~~containing~~ including playback time
information and entry points at a specific time interval for each media object,

a playlist manager file ~~containing~~ comprising playlist information including a
user-specified playback start program ID and ~~[[the]]~~ a specified playback start time and
end time of ~~[[said]]~~ a program~~[[;]]~~.

a management data file ~~containing~~ including a resume marker ~~consisting of~~
comprising a program ID for a program where playback was last interrupted and
playback interrupt time where playback was interrupted in the program~~[[;]]~~.

the trick play method achieving a fast-reverse play mode when the user selects
fast-reverse play, the trick play method comprising by:

reading ~~[[the]]~~ a media object information in ~~[[the]]~~ a program specified
by ~~[[the]]~~ a resume marker in sequence from the beginning;

sequentially comparing ~~[[the]]~~ a playback time in the media object
information with ~~[[the]]~~ an interrupt time to detect media object k where ~~[[the]]~~ a
cumulative playback time first exceeds the interrupt time;

detecting ~~[[the]]~~ an entry point identified by a number determined by calculating the difference of the interrupt time specified by the resume marker minus ~~[[the]]~~ a total playback time to ~~[[the]]~~ an immediately preceding media object, and dividing this difference by ~~[[the]]~~ a time search table resolution in the media object information of media object k;

reading and supplying to ~~[[the]]~~ a decoder entry frame data for ~~[[the]]~~ a media object data ~~unit~~ corresponding to said entry point;

thereafter repeating the above steps to supply entry frame data for ~~[[the]]~~ a preceding media object data ~~unit~~ to the decoder; and

rewriting the resume marker when fast-forward play ends with the program ID of the program at which playback is interrupted and the interrupt time in said program.

4. (Currently Amended) A playback method for reproducing multimedia content from a digital storage medium starting from a playback start time, the digital storage medium recording multimedia content ~~consisting of~~ comprising compression coded digital video data segmented into programs ~~units~~, each program ~~unit~~ segmented into media objects ~~units~~, and each media object ~~unit~~ segmented into media object data ~~units~~ MODU of which the first frame is a reproducible entry frame; and

recording management information including a time search table defining a time search entry at each specific time interval $[\Delta T]$ from a beginning of each media object, a playback time for each media object, and a playback start time for a specified program,

the time search table ~~containing~~ including an offset $[[OF]]$ indicating a data length from a beginning of the specified program to a beginning of a media object data ~~unit~~ ~~MODU~~ ~~containing~~ including the time search entry, and a frame count $[[FN]]$ indicating a number of frames from the beginning of the media object data ~~unit~~ ~~MODU~~ to the time search entry;

the playback method reproducing content from the playback start time in a playback mode, the playback method comprising ~~by means of~~:

~~steps (S3 to S6) for~~ detecting $[[the]]$ a media object at $[[the]]$ a playback start time by sequentially subtracting $[[the]]$ a playback time of each media object from $[[the]]$ a playback start time starting from $[[the]]$ a first media object, and comparing $[[the]]$ a resulting difference with $[[the]]$ a playback of $[[the]]$ a next media object;

~~steps (S7, S8) for~~ detecting a time search entry closest before the playback start time and $[[the]]$ a remaining time from said time search entry to the playback start time using said resulting difference and $[[the]]$ a specific time interval $[[\Delta T]]$;

~~steps (S9, S10) for~~ accessing ~~to the~~ a data offset in $[[the]]$ a specified program based on $[[the]]$ a time search table of the detected time search entry;

~~steps (S9, S11) for~~ decoding $[[the]]$ a ~~frame count~~ $[[FN]]$ number of counted frames from $[[the]]$ an accessed point based on the time search table of the detected time search entry;

~~steps (S12, S13) for~~ continuing decoding for $[[the]]$ a remaining time; and

~~steps for~~ displaying the decoded result ~~on screen~~ after the remaining time passes.

5. (Currently Amended) A playback method ~~as described in~~ according to claim 4, wherein the playback start time is a playback start time edited and specified by a user.

6. (Currently Amended) A playback method ~~as described in~~ according to claim 4, wherein the playback start time is a playback start time specified by a resume marker containing time information indicating where playback was interrupted.

7. (Currently Amended) A playback method for reproducing multimedia content from a digital storage medium starting from a playback start time, the digital storage medium recording multimedia content ~~consisting of~~ comprising compression coded digital video data segmented into programs ~~units~~, each program ~~unit~~ segmented into media objects ~~units~~, and each media object ~~unit~~ segmented into media object data ~~units~~ ~~MODU~~ of which the first frame is a reproducible entry frame; and

recording management information including a time search table defining a time search entry at each specific time interval $[[\Delta T]]$ from a beginning of each media object, a playback time for each media object, and a playback start time in a specified program,

the time search table ~~containing~~ including an offset $[[OF]]$ indicating a data length from a beginning of the specified program to a beginning of a media object data ~~unit~~ ~~MODU~~ ~~containing~~ including the time search entry, and a frame count $[[FN]]$ indicating a number of frames from the beginning of the media object data ~~unit~~ ~~MODU~~ to the time search entry;

the playback method reproducing content from near the playback start time in a fast-forward play mode, the playback method comprising ~~by means of~~:

~~steps (S3 to S6) for detecting~~ ~~[[the]]~~ a media object at ~~[[the]]~~ a playback start time by sequentially subtracting ~~[[the]]~~ a playback time of each media object from ~~[[the]]~~ a playback start time starting from ~~[[the]]~~ a first media object, and comparing ~~[[the]]~~ a resulting difference with ~~[[the]]~~ a playback of ~~[[the]]~~ a next media object;

~~steps (S7, S8) for detecting~~ a time search entry closest before the playback start time using said resulting difference and ~~[[the]]~~ a specific time interval $[\Delta T]$;

~~steps (S22) for accessing to the~~ a data offset position in ~~[[the]]~~ a specified program based on ~~[[the]]~~ a time search table of the detected time search entry;

~~steps (S23, S24) for decoding~~ an entry frame at which playback can start at the accessed data offset position and displaying ~~[[the]]~~ a decoded content;

~~steps (S26) for detecting~~ a next time search entry;

~~steps (S22) for accessing to the~~ a next data offset position in the specified program based on the time search table of the detected next time search entry; and

~~steps (S23, S24) for decoding~~ ~~[[an]]~~ a next entry frame at which playback can start at the next accessed data offset position and displaying the decoded content.

8. (Currently Amended) A playback method for reproducing multimedia content from a digital storage medium starting from a playback start time, the digital storage medium recording multimedia content ~~consisting of~~ comprising compression coded digital video data segmented into programs ~~units~~, each program ~~unit~~ segmented into media objects ~~units~~, and each media object ~~unit~~ segmented into media object data ~~units~~ ~~MODU~~ of which the first frame is a reproducible entry frame; and

recording management information including a time search table defining a time search entry at each specific time interval $[\Delta T]$ from a beginning of each media object, a playback time for each media object, and a playback start time in a specified program,

the time search table ~~containing~~ including an offset $[OF]$ indicating a data length from a beginning of the specified program to a beginning of a media object data unit ~~MODU~~ containing including the time search entry, and a frame count $[FN]$ indicating a number of frames from the beginning of the media object data unit ~~MODU~~ to the time search entry;

the playback method reproducing content from near the playback start time in a fast-reverse play mode, the playback method comprising ~~by means of:~~

~~steps (S3 to S6) for detecting~~ $[[the]]$ a media object at $[[the]]$ a playback start time by sequentially subtracting $[[the]]$ a playback time of each media object from $[[the]]$ a playback start time starting from $[[the]]$ a first media object, and comparing $[[the]]$ a resulting difference with $[[the]]$ a playback of $[[the]]$ a next media object;

~~steps (S7, S8) for detecting~~ a time search entry closest before the playback start time using said resulting difference and $[[the]]$ a specific time interval $[\Delta T]$;

~~steps (S22) for accessing to the~~ a data offset position in $[[the]]$ a specified program based on $[[the]]$ a time search table of the detected time search entry;

~~steps (S23, S24) for decoding an entry frame at which playback can start~~ at the accessed data offset position and displaying $[[the]]$ a decoded content;

~~steps (S26) for detecting~~ a previous time search entry;

~~steps (S22) for accessing to the~~ a next data offset position in the specified program based on the time search table of the detected time search entry; and

steps (S23, S24) for decoding an entry frame at which playback can start at the next accessed data offset position and displaying the decoded content.

9. (Currently Amended) A playback apparatus for reproducing multimedia content from a digital storage medium starting from a playback start time, the digital storage medium recording multimedia content ~~consisting of~~ comprising compression coded digital video data segmented into programs units, each program ~~unit~~ segmented into media objects units, and each media object ~~unit~~ segmented into media object data units ~~MODU~~ of which the first frame is a reproducible entry frame; and

recording management information including a time search table defining a time search entry at each specific time interval $[[\Delta T]]$ from a beginning of each media object, a playback time for each media object, and a playback start time for a specified program,

the time search table ~~containing~~ including an offset $[[OF]]$ indicating a data length from a beginning of the specified program to a beginning of a media object data ~~unit~~ ~~MODU~~ containing including the time search entry, and a frame count $[[FN]]$ indicating a number of frames from the beginning of the media object data ~~unit~~ ~~MODU~~ to the time search entry;

the playback apparatus comprising:

~~means (S3 to S6)~~ a media object detector configured to detect a ~~for detecting the media object at~~ $[[the]]$ a playback start time by sequentially subtracting $[[the]]$ a playback time of each media object from $[[the]]$ a playback start time starting from $[[the]]$ a first media object, and comparing $[[the]]$ a resulting difference with $[[the]]$ a playback of $[[the]]$ a next media object;

~~means (S7, S8) a time search entry detector configured to detect for~~
~~detecting~~ a time search entry closest before ~~[[the]]~~ a playback start time and ~~[[the]]~~ a
remaining time from said time search entry to the playback start time using said resulting
difference and ~~[[the]]~~ a specific time interval $[\Delta T]$;

~~means (S9, S10) an accessor configured to access a~~ ~~for accessing to the~~
data offset in ~~[[the]]~~ a specified program based on ~~[[the]]~~ a time search table of the
detected time search entry;

~~means (S9, S11, S12, S13) a frame count decoder configured to decode for~~
~~decoding~~ the frame count $[FN]$ number of frames from ~~[[the]]~~ an accessed point based
on the time search table of the detected time search entry ~~and decoding the remaining~~
time; and

~~means for~~ a display configured to display a ~~displaying the~~ decoded result
~~on-screen~~ after the remaining time passes.

10. (Currently Amended) A playback apparatus ~~as described in~~ according to claim 9,
wherein the playback start time is a playback start time edited and specified by a user.

11. (Currently Amended) A playback apparatus ~~as described in~~ according to claim 9,
wherein the playback start time is a playback start time specified by a resume marker
containing time information indicating where playback was interrupted.

12. (Currently Amended) A playback ~~method~~ apparatus for reproducing multimedia
content from a digital storage medium in a fast-forward play mode starting from a
playback start time, the digital storage medium recording multimedia content ~~consisting~~

of comprising compression coded digital video data segmented into programs ~~units~~, each program ~~unit~~ segmented into media objects ~~units~~, and each media object ~~unit~~ segmented into media object data ~~units~~ ~~MODU~~ of which the first frame is a reproducible entry frame; and

recording management information including a time search table defining a time search entry at each specific time interval $[[\Delta T]]$ from a beginning of each media object, a playback time for each media object, and a playback start time in a specified program,

the time search table ~~containing~~ including an offset $[[OF]]$ indicating a data length from a beginning of the specified program to a beginning of a media object data ~~unit~~ ~~MODU~~ ~~containing~~ comprising the time search entry, and a frame count $[[FN]]$ indicating a number of frames from the beginning of the media object data ~~unit~~ ~~MODU~~ to the time search entry;

the playback apparatus comprising:

~~means (S3 to S6) a media object detector configured to detect a for~~
~~detecting the media object at~~ $[[the]]$ a playback start time by sequentially subtracting $[[the]]$ a playback time of each media object from the playback start time starting from $[[the]]$ a first media object, and comparing $[[the]]$ a resulting difference with $[[the]]$ a playback of $[[the]]$ a next media object;

~~means (S7, S8) a time search entry detector configured to detect for~~
~~detecting a time search entry closest before the playback start time using said resulting~~
~~difference and~~ $[[the]]$ a specific time interval $[[\Delta T]]$;

~~means (S22) an accessor configured to access a~~ for accessing to the data
offset position in the specified program based on ~~[[the]]~~ a time search table of the
detected time search entry;

~~means (S23, S24) an entry frame decoder configured to decode~~ for
~~decoding~~ an entry frame at which playback can start at the accessed data offset position
and displaying ~~[[the]]~~ a decoded content; and

~~means (S26) a next time search entry detector configured to detect~~ for
~~detecting~~ a next time search entry.

13. (Currently Amended) A playback ~~method~~ apparatus for reproducing multimedia
content from a digital storage medium in a fast-reverse play mode starting from a
playback start time, the digital storage medium recording multimedia content ~~consisting~~
~~of comprising~~ compression coded digital video data segmented into programs ~~units~~, each
program ~~unit~~ segmented into media objects ~~units~~, and each media object ~~unit~~ segmented
into media object data ~~units~~-MODU of which the first frame is a reproducible entry
frame; and

recording management information including a time search table defining a time
search entry at each specific time interval ~~[[ΔT]]~~ from a beginning of each media object,
a playback time for each media object, and a playback start time in a specified program,

the time search table ~~containing~~ including an offset ~~[[OF]]~~ indicating a data length
from a beginning of the specified program to a beginning of a media object data ~~unit~~
MODU ~~containing~~ comprising the time search entry, and a frame count ~~[[FN]]~~ indicating

a number of frames from the beginning of the media object data unit ~~MODU~~ to the time search entry;

the playback apparatus comprising:

~~means (S3 to S6)~~ a media object detector configured to detect a for
~~detecting the media object at [[the]] a playback start time by sequentially subtracting~~
~~[[the]] a playback time of each media object from [[the]] a playback start time starting~~
~~from [[the]] a first media object, and comparing [[the]] a resulting difference with [[the]]~~
~~a playback of [[the]] a the next media object;~~

~~means (S7, S8)~~ a time search entry detector configured to detect for
~~detecting a time search entry closest before the playback start time using said resulting~~
~~difference and [[the]] a specific time interval $[\Delta T]$;~~

~~means (S22)~~ an accessor configured to access a for accessing to the data
~~offset position~~ in the specified program based on [[the]] a time search table of the
detected time search entry;

~~means (S23, S24)~~ an entry frame decoder configured to decode for
~~decoding an entry frame at which playback can start at the accessed data offset position~~
~~and displaying [[the]] a decoded content; and~~

~~means (S26)~~ a previous time search entry detector configured to detect for
~~detecting a previous time search entry.~~